

## 28. SOME MORE SPECIES OF ANURANS FROM DHARWAD, NORTH KARNATAKA

This note on Anurans from areas of Dharwad in north Karnataka is intended to add to the list of Indian species of Anura, as tabulated by Inger and Dutta (1987). Collections of frogs and toads were made from areas of Dharwad and adjoining places in north Karnataka, mainly in order to study the occurrence of the two most interesting forms of commensal opalinid ciliate protozoa, *Protoopalina* and *Zelleriella*, in Indian Anura. These collections were made by the present writer from 1944 to 1948, and later by Miss Lucy Lobo in 1956 and 1959. The host frogs examined for the protozoological investigation were identified by Dr. L.S. Ramaswamy of the Mysore University and some by the Zoological Survey of India at Calcutta. All the frog samples are deposited in the Karnataka College (Department of Zoology) Museum at Dharwad.

Except Pelobatidae, which are confined to the north-eastern region of India, the remaining 4 families: Bufonidae, Microhylidae, Ranidae and Rhacophoridae, are well represented in north Karnataka. The faunal lists presented above include a total number of 19 species belonging to 9 genera, of which the two species of *Rana*, namely *Tomopterna rufescens* and *Rana keralensis*, are examples of very rare occurrence that need inclusion in the main list of India species. In addition to these two, 6 other species: *Micrixalus saxicola*, *Micrixalus opisthorhodus*, *Rana leptodactyla*, *Rana malabarica*, *Tomopterna breviceps*, and *Bufo beddomii*, which are omitted by Inger and Dutta (1987), should be considered for inclusion under this group. Only 3 species of frogs, namely *Rhacophorus*, and *Philautus* were not determined.

The Anuran surveys undoubtedly are still considered incomplete, and any additional collection, observation or resurvey would certainly be greeted with complacency in a vast country like ours. By no means are the interrelationships and the course of evolution of the Anuran families, genera and species fully understood. Paleontological data for Anura is very scant; in addition, the groups themselves are so unrelated that linking one with the others becomes extremely difficult.

However, certain indications as to the probable phylogeny have been gathered by using concomitantly data on frog organisms or the commensal opalinids such as (1) *Protoopalina* (binucleated but elongated in form), (2) *Zelleriella* (binucleated but flattened in form), (3) *Cepedea* (multinucleated but elongated) and (4) *Opalina* (multi-nucleated but flattened) to trace the course of evolution and migratory routes which both the frog host and its opalinid commensal have traversed during geologi-

cal times towards the eastward and westward directions of the earth (Metcalf 1940).

## I. List of frogs and toads studied during 1944 - 1948 (Uttangi)

Host	Locality
1. <i>Bufo melanostictus</i>	Dharwad
2. <i>Microphyla ornata</i> *	Naglavi
3. <i>Micrixalus opisthorhodus</i>	Dharwad
4. <i>Micrixalus saxicola</i>	Dharwad
5. <i>Uperodon systoma</i>	Dharwad
6. <i>Rana tigerina</i>	Widespread
7. <i>Rana leptodactyla</i>	Dharwad
8. <i>Rana temporalis</i>	Dharwad
9. <i>Rana limnocharis</i> *	Dharwad
10. <i>Tomopterna breviceps</i> *	Dharwad
11. <i>Rana malabarica</i> *	Yellapur
12. <i>Rana keralensis</i>	Dandeli
13. <i>Philautus</i> sp.*	Castlerock
14. <i>Rana cyanophlyctis</i>	Widespread

## II. List of frogs and toads studied during 1956-1959 (Lucy Lobo)

Host	Locality
1. <i>Bufo melanostictus</i>	Widespread
2. <i>Bufo beddomii</i>	Castlerock
3. <i>Microphyla ornata</i> *	Anmode
4. <i>Tomopterna breviceps</i> *	Londa
5. <i>Rana keralensis</i>	Dharwad
6. <i>Rana curtipes</i>	Anmode
7. <i>Rana cyanophlyctis</i>	Dharwad
8. <i>Rana limnocharis</i>	Dandeli
9. <i>Tomopterna rufescens</i>	Castlerock
10. <i>Rana malabarica</i>	Londa
11. <i>Rana tigerina</i>	Widespread
12. <i>Philautus</i> sp.	Castlerock
13. <i>Rhacophorus</i> sp.	Castlerock
14. <i>Philautus</i> sp.	Anmode
15. <i>Kaloula pulchra</i>	Londa

\* indicates presence of binucleated opalinid genera *Protoopalina* and *Zelleriella* on the frog host.

For example, the occurrence of protoopalina group II of Metcalf in both Discoglossid and Pelobatid toads suggests their origin and spread as being somewhat parallel. Both of them evolved in India (Himalayan highlands) at a time when Australia had separated from Asia. The point of interest is that the Discoglossid protoopalina group II

of Metcalf are still found in South India (Uttangi 1951 and 1961) although the Discoglossids themselves are gone. The Discoglossids have not been in contact with *Zelleriella*. The adoption of protoopalina (II) by the south Indian frogs (*Microhyla* and *Tomopterna*) from Discoglossids through the Western Mediterranean land strips is quite probable.

It is unfortunate that none of the Indian species belonging to Pelobatidae have been examined so far for their opalinas. If such examinations were done, the data could well provide clinching evidence in support of their dispersal and adoption of commensals in southern India, which was once part of Lemuria. The most archaic families of Anura bear the most archaic opalina. Each

new family group in the course of its evolution adopts through tadpoles opalinas of its ancestors. From the phylogeny of the opalina can thus be deduced the phylogeny of the frog host that carries the opalina with it. Further studies in this direction may provide significant data in the reconstruction of the phylogeny of an animal group that holds the status as the first land vertebrates.

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## 29. OCCURRENCE OF *ANTHIAS TAENIATUS* (PISCES: SERRANIDAE) IN INDIAN WATERS (With two text-figures)

With improvements in traditional boats and equipment, and with the introduction of modern methods of fishing (especially trawling), many hitherto unrecorded species and quite a few new species are being periodically recorded from Indian waters. Katayama (1978), in recording the species *Pseudanthias taeniatus* (Klunzinger) from Hachizo Island and the coast of Izu, Japan, gave a full description of the species.

In the course of taxonomic study on serranid fishes, I came across two specimens of *Anthias* from Vishakapatnam (17°44' N, 83° 23' E) which agree with *Anthias taeniatus* Klunzinger of Heemstra (1973), and with the description and the illustration of *P. taeniatus* of Katayama (1978).

Only two specimens were found in the trawl catches of Vishakapatnam in the month of April 1986. The two specimens differ in the length of the second pelvic fin ray. Descriptions, body measurements and meristic data are given in Table 1 to allow comparison with specimens described from other localities.

**Description:** A rather small, compressed *Anthias* fish, dorsal profile slightly more convex than ventral, maximum depth at dorsal origin. Mouth oblique, lower jaw anterior to upper, maxillary width equal to less than interorbital width, reaching to below posterior border of eye.

Eye in middle of anterior half of head; interorbital slightly convex, less than eye diameter. One slightly enlarged caniniform tooth on each side of symphysis of either jaw; lower jaw with patches of small canines extending inwardly from each of these enlarged canines and running posteriorly in a narrow band on the dentaries. Another large, retrorse canine at the middle of each dentary. Upper jaw with an inner band of very small, depressible canine teeth and an outer row of larger, fixed canines. A pointed large canine exposed anteriorly on each side of upper jaw and visible externally when the mouth is closed. Medial to these two large outer canines is another pair of equally large, inner teeth which are directed posteriorly, pointing towards the vomers; there is a wide space between these two large inner canines, an arrowhead-shaped band of teeth on vomers; narrow band of teeth on palatines; patches of minute teeth on pharyngeals. Preopercle with a serrated vertical edge, two serrae along angle slightly larger. Opercle with three spines, middle one acute and closer to lower one. Head covered with ctenoid scales; maxilla covered with scales.

Dorsal origin slightly anterior to that of pectorals, whose origin is in front of that of pelvics; dorsal spines increasing in length posteriorly; eighth, ninth and tenth spines equal and longest. Fins naked, small scales at base